

**REMARKS**

By this amendment, claims 14 and 21-26 have been amended. Claims 14 and 21-26 are currently pending in the application, of which claims 14 and 26 are independent claims.

In view of the above amendments and the following Remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending objections and rejections for the reasons discussed below.

***Rejections Under 35 U.S.C. §103***

Claims 14, 21-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 8,852,481 issued to Hwang (“Hwang”) in view of U. S. Patent No. 5,162,933 issued to Kakuda, *et al.* (“Kakuda”) and further in view of Japanese Patent Publication No. 5-241173 to Yatabe (“Yatabe”). Applicants respectfully traverse this rejection for at least the following reasons.

Independent claim 14 recites:

“at least one of the gate wire and the data wire comprises a main layer and a supplemental layer, and  
the supplemental layer is substantially inert to an etchant used for etching the transparent layer for preventing the gate pad and or the data wire from being eroded by the etchant.”

In the Office Action, the Examiner admitted “Hwang does not expressly disclose that the material for the two layer structure of the gate wire and data wire as the main layer and the supplementary layer as claimed” (Office Action, page 3). Regarding this missing feature, the Examiner stated “Kakuda discloses ... that the gate line (13) and the data line (11), both of them, are formed by laminating metal layers (13a, 13b, 11a, 11b), and such laminating metal layers

prevents the generation of hillock and its surface remain smooth, and the thin film transistor formed on such a layer remarkably decreasing the number of shorts”. (Office Action, page 3)

As the Examiner indicated, Kakuda discloses “the gate line 13 and the data line 11 are formed by laminating  $\text{MoCr}_x$  and aluminum layers” (column 10, lines 32-33). However,  $\text{MoCr}_x$  was laminated on the aluminum film because it exhibits “excellent adhesion to a silicon nitride film and an ITO film” and “ $\text{MoCr}_x$  thin film is easy to etch with the aluminum etchant and that the laminated film pattern by etching has gently sloping side wall toward the substrate” (Lee, column 10, lines 19-29). Thus, Kakuda does *not* disclose that the  $\text{MoCr}_x$  thin film is “*substantially inert to an etchant* used for etching the transparent layer for preventing the gate pad and the data wire from being eroded by the etchant”, as recited in claim 14.

The Examiner further stated “Yatabe discloses (abstract) that the material of the electrode for liquid crystal display comprising metal nitride that is a solvent-resistance or air permeation resistance so that is substantially inert to an etchant used for etching the transparent layer and preventing the gate pad and the data wire from being eroded by the etchant” (Office Action, pages 3-4).

Yatabe is directed to forming a transparent conductive layer. Yatabe is not directed to forming a gate wire or a data wire. In forming a transparent conductive layer, in Yatabe, a metal nitride layer is formed on a transparent sheet and a transparent conductive layer is formed thereon. The metal nitride layer is formed as *a solvent-resistant layer/air permeation-resistant layer*, and hence it has nothing to do with “preventing *the gate pad or the data wire* from being eroded by the etchant”, as recited in claim 14.

Thus, none of the cited references discloses or suggests forming at least one of the *gate wire and the data wire* comprising a main layer and a supplemental layer which is “substantially

inert to an etchant used for etching the transparent layer for *preventing the gate pad or the data wire from being eroded by the etchant*", as claimed.

Also, Kakuda and Yatabe involve two different operational principles that are *mutually exclusive*. As explained above, Kakuda discloses forming *the gate wire and data wire* by laminating the MoCr<sub>x</sub> film on the aluminum film because (a) the MoCr<sub>x</sub> film improves adhesion to a silicon nitride film and an ITO film, (b) the MoCr<sub>x</sub> thin film is easy to etch with the aluminum etchant and (c) the laminated film pattern by etching has gently sloping side wall toward the substrate.

In this regard, Yatabe is directed to forming an electrode exhibiting excellent electrode flatness. To achieve this, a metal nitride layer (e.g., Mo nitride) is formed on a transparent sheet (e.g., resin) and a transparent conductive layer is formed on the metal nitride layer. The metal nitride layer is formed as a solvent-resistant layer/air permeation-resistant layer.

Thus, Kakuda and Yatabe involve two totally different operational principles, and therefore it would be practically impossible to combine them *without altering their operational principles*. For example, it would not be possible to replace the MoCr<sub>x</sub> film of Kakuda with the metal nitride layer of Yatabe without sacrificing (a) improved adhesion to a silicon nitride film and an ITO film, (b) easiness to etch with the aluminum etchant and (c) the gently sloping side wall toward the substrate. Hence, a person skilled in the art would not have been motivated to combine Kakuda and Yatabe.

For these reasons, it is submitted that claim 14 is patentable over Hwang, Kakuda and Yatabe. Claims 21-25 that are dependent from claim 14 would be also patentable at least for the same reason.

Independent claim 26 recites:

“at least one of the gate wire and the data wire comprises a main layer and a supplemental layer, and  
the main layer comprises metal or a metal alloy, and the supplementary layer metal nitride or metal alloy nitride”

Hwang and Kakuda fails to disclose or suggest the supplementary layer comprising metal nitride or metal alloy nitride. As previously mentioned, Yatabe is directed to forming a transparent conductive layer. Yatabe is not directed to forming a gate wire or a data wire. In forming a transparent conductive layer, in Yatabe, a metal nitride layer is formed on a transparent sheet and a transparent conductive layer is formed thereon. The transparent conductive layer is not metal or an metal alloy. Thus, Yatabe fails to disclose “the main layer comprises *metal or a metal alloy*”. Also, as previously mentioned, there is no motivation to combine Kakuda and Yatabe. Thus, it is submitted that claim 26 is patentable over Hwang, Kakuda and Yatabe.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. §103(a) rejection of claims 14 and 21-26.

***Other Matters***

In this response, claims 14 and 21-26 have been amended to amend the preamble because “liquid crystal display” appears to unnecessary limit the claim scope.

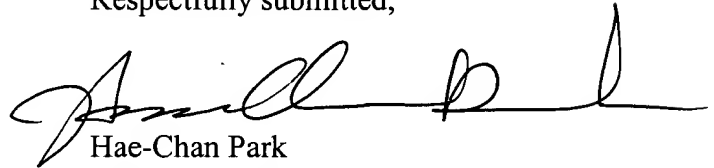
**CONCLUSION**

Applicants believe that a full and complete response has been made to the pending Office Action and respectfully submits that all of the stated grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact the Applicants' undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,



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